

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

1. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
2. $a^m \times a^n = a^{m+n}$
3. $a^m \div a^n = a^{m-n}$
4. $(a^m)^n = a^{mn}$
5. $\log_a mn = \log_a m + \log_a n$
6. $\log_a \left(\frac{m}{n}\right) = \log_a m - \log_a n$
7. $\log_a m^n = n \log_a m$
8. $\log_a b = \frac{\log_c b}{\log_c a}$
9. $T_n = a + (n-1)d$
10. $S_n = \frac{n}{2}[2a + (n-1)d]$
11. $T_n = ar^{n-1}$
12. $S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, r \neq 1$
13. $S_\infty = \frac{a}{1 - r}, |r| < 1$
14. $y = uv, \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$
15. $y = \frac{u}{v}, \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$
16. $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$
17. Luas di bawah lengkung
Area under a curve
$$= \int_a^b y \, dx \text{ atau (or)}$$
$$= \int_a^b x \, dy$$
18. Isi padu janaan
Volume generated
$$= \int_a^b \pi y^2 \, dx \text{ atau (or)}$$
$$= \int_a^b \pi x^2 \, dy$$
19. $I = \frac{Q_1}{Q_0} \times 100$
20. $\bar{I} = \frac{\sum W_i I_i}{\sum W_i}$
21. ${}^n P_r = \frac{n!}{(n-r)!}$
22. ${}^n C_r = \frac{n!}{(n-r)!r!}$
23. $P(X=r) = {}^n C_r p^r q^{n-r}, p+q=1$
24. Min / Mean, $\mu = np$
25. $\sigma = \sqrt{npq}$
26. $Z = \frac{X - \mu}{\sigma}$
27. Panjang lengkok, $s = j\theta$
Arc length, $s = r\theta$
28. Luas sektor, $L = \frac{1}{2} j^2 \theta$
Area of sector, $A = \frac{1}{2} r^2 \theta$
29. $\sin^2 A + \cos^2 A = 1$
 $\sin^2 A + \cos^2 A = 1$
30. $\sec^2 A = 1 + \tan^2 A$
 $\sec^2 A = 1 + \tan^2 A$
31. $\operatorname{cosec}^2 A = 1 + \cot^2 A$
 $\operatorname{cosec}^2 A = 1 + \cot^2 A$

$$32. \sin 2A = 2 \sin A \cos A$$

$$\sin 2A = 2 \sin A \cos A$$

$$33. \cos 2A = \cos^2 A - \sin^2 A$$

$$= 2 \cos^2 A - 1$$

$$= 1 - 2 \sin^2 A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$= 2 \cos^2 A - 1$$

$$= 1 - 2 \sin^2 A$$

$$34. \tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

$$35. \sin (A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\sin (A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$36. \cos (A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\cos (A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$37. \tan (A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$38. \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$39. a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

40. Luas segi tiga / Area of triangle

$$= \frac{1}{2} ab \sin C$$

41. Titik yang membahagi suatu tembereng garis

A point dividing a segment of a line

$$(x, y) = \left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$$

42. Luas segi tiga / Area of triangle

$$= \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

$$43. |\mathbf{r}| = \sqrt{x^2 + y^2}$$

$$44. \hat{\mathbf{r}} = \frac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$$

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**THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,1)
KEBARANGKALIAN Hujung ATAS Q(z) BAGI TABURAN NORMAL N(0,1)**

z											TOLAK								
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	4	8	12	16	20	24	28	32	36
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	4	8	12	16	20	24	28	32	36
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859	4	8	12	15	19	23	27	31	35
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483	4	7	11	15	19	22	26	30	34
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121	4	7	11	14	18	22	25	29	32
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776	3	7	10	14	17	20	24	27	31
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451	3	7	10	13	16	19	23	26	29
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148	3	6	9	12	15	18	21	24	27
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867	3	5	8	11	14	16	19	22	25
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611	3	5	8	10	13	15	18	20	23
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379	2	5	7	9	12	14	16	19	21
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170	2	4	6	8	10	12	14	16	18
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985	2	4	6	7	9	11	13	15	17
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823	2	3	5	6	8	10	11	13	14
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681	1	3	4	6	7	8	10	11	13
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559	1	2	4	5	6	7	8	10	11
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455	1	2	3	4	5	6	7	8	9
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367	1	2	3	4	4	5	6	7	8
1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294	1	1	2	3	4	4	5	6	6
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233	1	1	2	2	3	4	4	5	5
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183	0	1	1	2	2	3	3	4	4
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143	0	1	1	2	2	2	3	3	4
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110	0	1	1	1	2	2	2	3	3
2.3	.0107	.0104	.0102		.00990	.00964	.00939	.00914			0	1	1	1	1	2	2	2	2
								.00889	.00866	.00842	3	5	8	10	13	15	18	20	23
2.4	.00820	.00798	.00776	.00755	.00734						2	5	7	9	12	14	16	18	21
					.00714	.00695	.00676	.00657	.00639		2	4	6	8	11	13	15	17	19
2.5	.00621	.00604	.00587	.00570	.00554	.00539	.00523	.00508	.00494	.00480	2	3	5	6	8	9	11	12	14
2.6	.00466	.00453	.00440	.00427	.00415	.00402	.00391	.00379	.00368	.00357	1	2	3	5	6	7	8	9	10
2.7	.00347	.00336	.00326	.00317	.00307	.00298	.00289	.00280	.00272	.00264	1	2	3	4	5	6	7	8	9
2.8	.00256	.00248	.00240	.00233	.00226	.00219	.00212	.00205	.00199	.00193	1	1	2	3	4	4	5	6	6
2.9	.00187	.00181	.00175	.00169	.00164	.00159	.00154	.00149	.00144	.00139	0	1	1	2	2	3	3	4	4
3.0	.00135	.00131	.00126	.00122	.00118	.00114	.00111	.00107	.00104	.00100	0	1	1	2	2	2	3	3	4

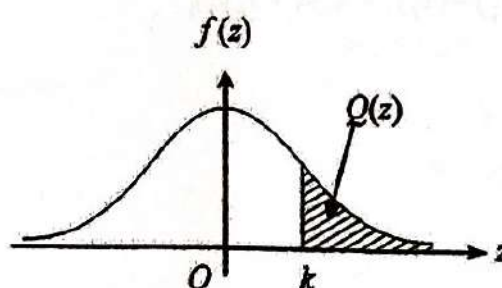
For negative z use relation:

Bagi z negatif guna hubungan:

$$Q(z) = 1 - Q(-z) = P(-z)$$

$$f(z) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}z^2\right)$$

$$Q(z) = \int_k^{\infty} f(z) dz$$



Example / Contoh:

If $X \sim N(0, 1)$, then

Jika $X \sim N(0, 1)$, maka

$$P(X > k) = Q(k)$$

$$P(X > 2.1) = Q(2.1) = 0.0179$$

Bahagian A

[50 markah]

Jawab semua soalan.

- 1 Selesaikan persamaan serentak yang berikut:
Solve the following simultaneous equations:

$$2y = -2x - 10 \quad \text{dan / and} \quad 2y^2 + x = 5$$

[5 markah]

[5 marks]

Jawapan / Answer:

[Lihat halaman sebelah

2 (a) Buktikan $\frac{\cot^2 x}{1 + \cot^2 x} = \cos^2 x$. [2 markah]

Prove that $\frac{\cot^2 x}{1 + \cot^2 x} = \cos^2 x$. [2 marks]

(b) (i) Lakarkan graf $y = \frac{2}{\cos x} \left(\frac{\cot^2 x}{1 + \cot^2 x} \right) + 1$ untuk $0 \leq x \leq 2\pi$. [3 markah]

Sketch the graph of $y = \frac{2}{\cos x} \left(\frac{\cot^2 x}{1 + \cot^2 x} \right) + 1$ for $0 \leq x \leq 2\pi$. [3 marks]

(ii) Seterusnya, dengan menggunakan paksi yang sama, lakarkan satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan

$$\frac{2}{\cos x} \left(\frac{\cot^2 x}{1 + \cot^2 x} \right) = \frac{x}{\pi} - 1 \text{ untuk } 0 \leq x \leq 2\pi.$$

Nyatakan bilangan penyelesaian itu. [3 markah]

Hence, using the same axes, sketch a suitable straight line to find the

number of solutions for the equation $\frac{2}{\cos x} \left(\frac{\cot^2 x}{1 + \cot^2 x} \right) = \frac{x}{\pi} - 1$

for $0 \leq x \leq 2\pi$.

State the number of solutions. [3 marks]

Jawapan / Answer:

3 (a) Diberi $\frac{d}{dx}(3x^2 - x) = f(x)$, cari nilai $\int_0^1 f(x) dx$. [3 markah]

Given $\frac{d}{dx}(3x^2 - x) = f(x)$, find the value of $\int_0^1 f(x) dx$. [3 marks]

Jawapan / Answer:

- (b) Fungsi kecerunan suatu lengkung adalah $3x - h$. Tangen kepada lengkung itu pada titik $(5, 7.5)$ memotong paksi- x pada $x = 3.75$.
Cari persamaan lengkung itu. [3 markah]

The gradient function of a curve is $3x - h$. Tangent to the curve at point $(5, 7.5)$ cuts the x -axis at $x = 3.75$.

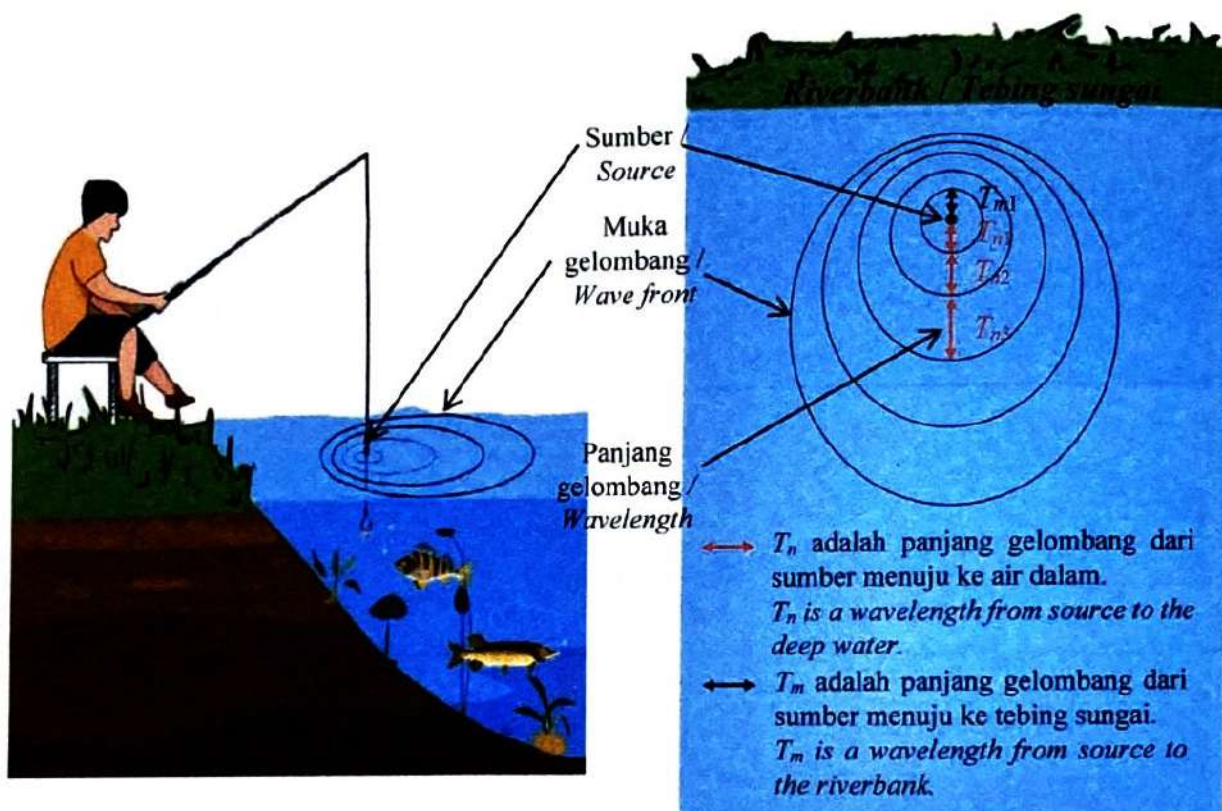
Find the equation of the curve. [3 marks]

Jawapan / Answer:

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- 4 Rajah 1(a) menunjukkan muka gelombang yang terbentuk selepas umpan dijatuhkan ke dalam sebuah sungai. Rajah 1(b) menunjukkan pandangan atas bagi muka gelombang yang terbentuk di atas permukaan air sungai tersebut. Kedua-dua jenis panjang muka gelombang membentuk suatu janjang geometri.

Diagram 1(a) shows a wave front formed after bait is dropped into a river. Diagram 1(b) shows the plan of the wave front formed on the surface of the river. Both type of wavelengths formed a geometric progression.



Rajah 1(a) / Diagram 1(a)

Rajah 1(b) / Diagram 1(b)

- (a) Diberi hasil tambah panjang gelombang dari sumber menuju ke air dalam ialah

$$S_n = \frac{5}{2} + 3(2^{n-1} - 1).$$

Cari

Given that the sum of the wavelength from the source towards the deep water is

$$S_n = \frac{5}{2} + 3(2^{n-1} - 1).$$

Find

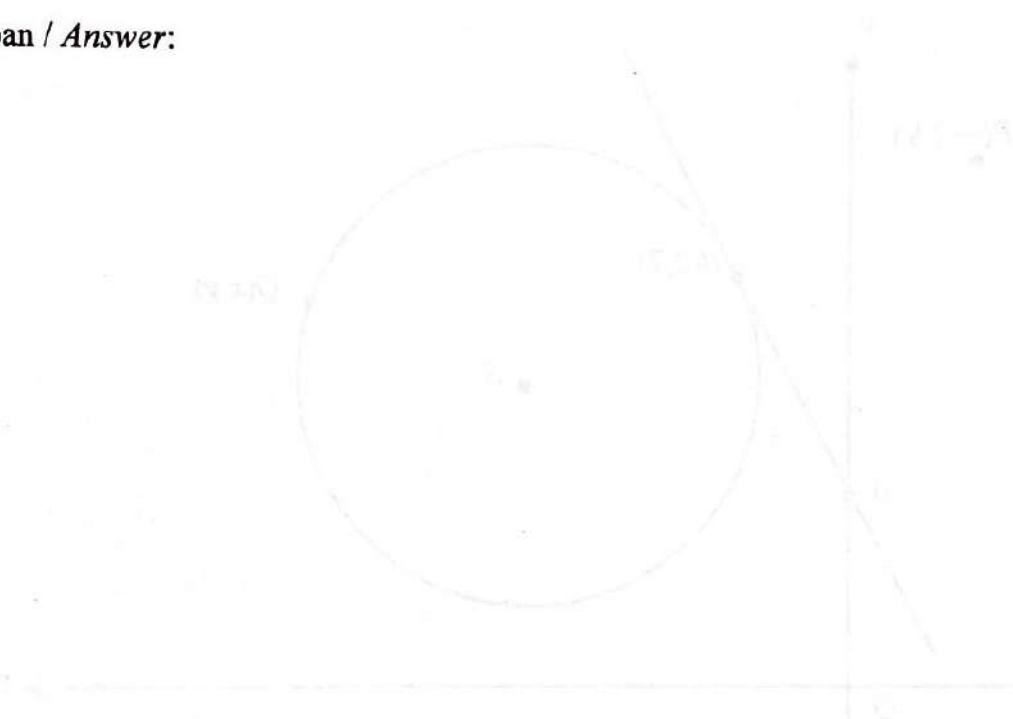
- (i) panjang gelombang yang pertama,
the first wavelength,
- (ii) nisbah sepunya janjang ini.
the common ratio of this progression.

[4 markah]
[4 marks]

- (b) Diberi bahawa $9T_4 = 10T_5$ dan panjang gelombang pertama dari sumber menuju ke tebing sungai ialah 1 cm, cari jumlah jarak panjang gelombang apabila muka gelombang berhenti terbentuk. [3 markah]

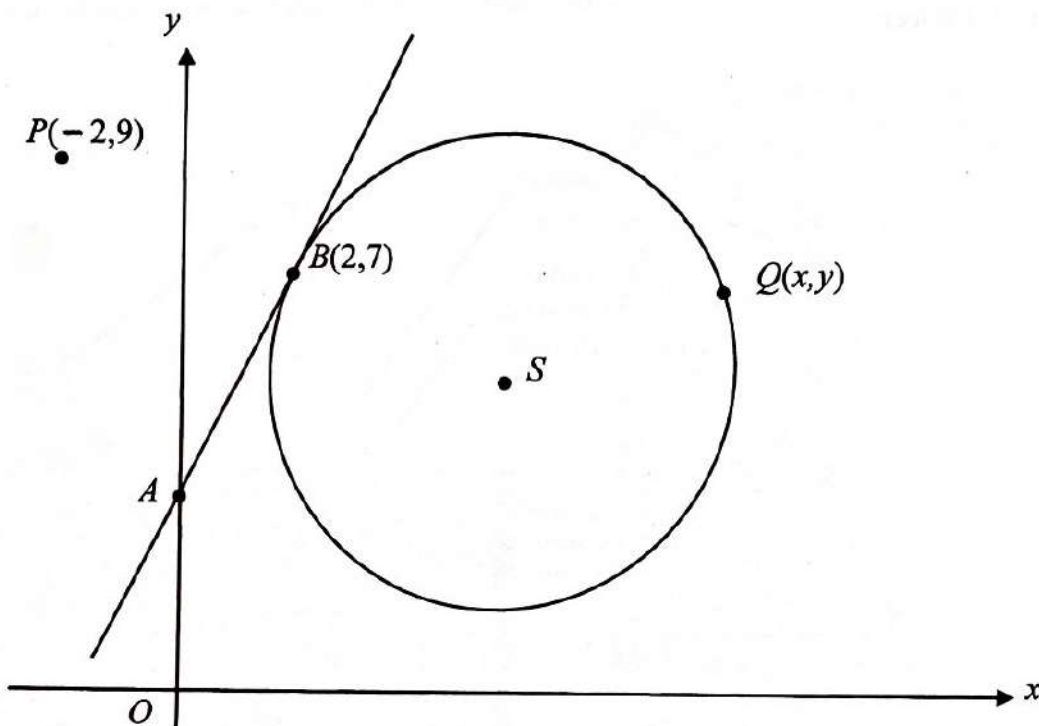
Given that $9T_4 = 10T_5$ and the first wavelength from the source towards the riverbank is 1 cm, find the total distance of the wavelength when the wave front stops forming. [3 marks]

Jawapan / Answer:



- 5 Rajah 2 menunjukkan satu titik Q yang bergerak di sepanjang lilitan sebuah bulatan dengan pusat S . Garis lurus $2x = y - 3$ ialah tangen kepada bulatan itu pada titik B dan bersilang pada paksi- y di titik A .

Diagram 2 shows a point Q that moves along the circumference of a circle with centre S . The straight line $2x = y - 3$ is tangent to the circle at point B and intersects the y -axis at point A .



Rajah 2
Diagram 2

- (a) Titik S ialah imej bagi titik P di bawah satu pantulan pada garis $2x = y - 3$.
Titik-titik P , B dan S adalah segaris.
Cari persamaan lokus bagi titik Q . [4 markah]

Point S is the image of point P under a reflection at line $2x = y - 3$. Points P , B and S are collinear.

Find the equation of locus of point Q . [4 marks]

- (b) Jika garis lurus BS dipanjangkan kepada titik N , dengan keadaan $3BN = 4SN$,
hitung luas sisi empat $OABN$. [4 markah]

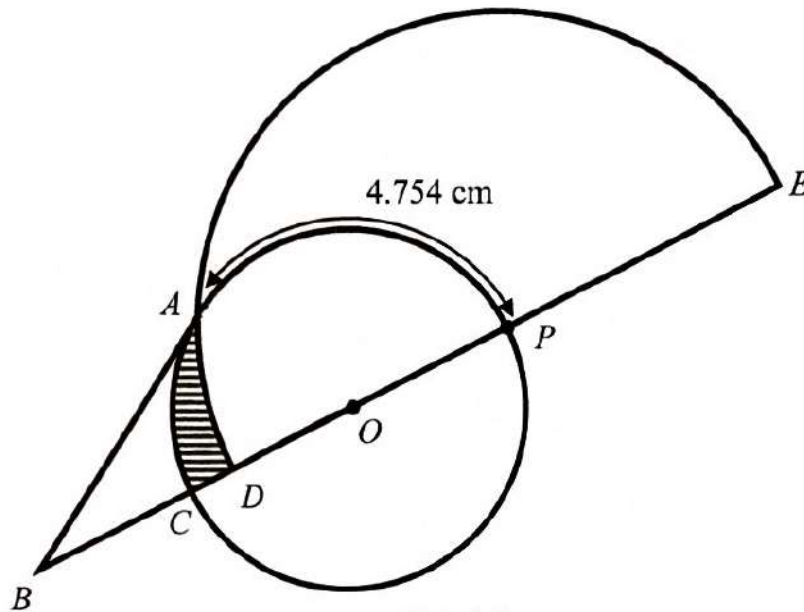
If the straight line BS is extended to point N , such that $3BN = 4SN$, calculate the area of quadrilateral $OABN$. [4 marks]

Jawapan / Answer:

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DUTY FREE

- 6 Rajah 3 menunjukkan sebuah bulatan ACP dengan pusat O dan sebuah semibulatan EAD dengan pusat P .

Diagram 3 shows a circle ACP with centre O and a semicircle EAD with centre P .



Rajah 3
Diagram 3

Garis lurus BA adalah tangen kepada bulatan ACP pada titik A . Bulatan ACP dan semibulatan EAD bersilang di titik A dan titik P .

The straight line BA is a tangent to the circle ACP at point A . Circle ACP and semicircle EAD intersect at point A and point P .

[Guna / Use $\pi = 3.142$]

- (a) Diberi bahawa $\angle AOP = 113.56^\circ$ dan $BO - BA = k$ cm.
Cari nilai k dan nyatakan jawapan anda kepada dua tempat perpuluhan. [3 markah]

It is given that $\angle AOP = 113.56^\circ$ and $BO - BA = k$ cm.
Find the value of k and state your answer in two decimal places. [3 marks]

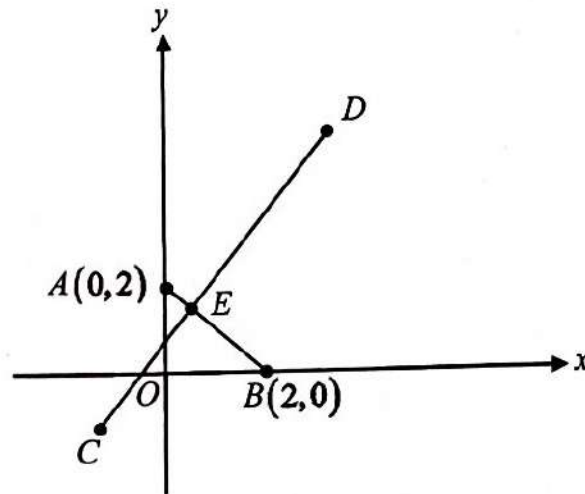
- (b) Cari luas, dalam cm^2 , kawasan berlorek. [5 markah]

Find the area, in cm^2 , of the shaded region. [5 marks]

Jawapan / Answer:

[Lihat halaman sebelah

- 7 Rajah 4 menunjukkan garis lurus AB bersilang dengan garis lurus CD pada titik E .
 Diagram 4 shows the straight line AB intersects with the straight line CD at point E .



Rajah 4
 Diagram 4

Persamaan garis lurus CD ialah $-3x + \sqrt{2}y = 1$.

The equation of straight line CD is $-3x + \sqrt{2}y = 1$.

- (a) Cari koordinat titik E dalam bentuk $(p + q\sqrt{2}, r + s\sqrt{2})$. [5 markah]

Find the coordinates of point E in the form $(p + q\sqrt{2}, r + s\sqrt{2})$. [5 marks]

- (b) Diberi jarak antara titik E dan titik $(-1 + m\sqrt{2}, -\sqrt{2})$ adalah $\sqrt{17}$.

Cari nilai-nilai m . [3 markah]

Given the distance between point E and point $(-1 + m\sqrt{2}, -\sqrt{2})$ is $\sqrt{17}$.

Find the values of m . [3 marks]

Jawapan / Answer:

Bahagian B

[30 markah]

Bahagian ini mengandungi empat soalan. Jawab tiga soalan.

- 8 (a) Didapati bahawa kebarangkalian seorang pesakit mengalami kesan sampingan apabila mengambil ubat-ubatan baharu ialah p .

It is found that the probability that a patient will experience side effect while taking new medications is p .

- (i) Diberi bilangan pesakit yang mengalami kesan sampingan apabila mengambil ubat-ubatan mempunyai min 20 dan varians 16, cari nilai p .

Given the number of patients who experience side effect while taking the new medication has a mean of 20 and a variance of 16, find the value of p .

- (ii) Jika 10 pesakit dipilih secara rawak, cari kebarangkalian bahawa 3 pesakit mengalami kesan sampingan.

If 10 patients are selected at random, find the probability that 3 patients will experience the side effect.

[4 markah]

[4 marks]

Jawapan / Answer:

- (b) Tekanan darah diastolik untuk seorang wanita di sebuah daerah tertentu adalah mengikut taburan normal dengan min μ mmHg dan sisihan piawai 50 mmHg. Jika seorang wanita dipilih secara rawak, didapati kebarangkalian tekanan darah diastolik kurang daripada 72 mmHg ialah 0.4364.

The diastolic blood pressure for a woman in a certain district follows a normal distribution with a mean μ mmHg and a standard deviation of 50 mmHg. If a woman is randomly selected, it is found that the probability that diastolic blood pressure less than 72 mmHg is 0.4364.

- (i) Cari nilai μ .

Find the value of μ .

- (ii) Rawatan khas akan diberikan kepada wanita yang mempunyai tekanan darah diastolik melebihi 144.1 mmHg. Cari kebarangkalian wanita yang layak mendapat rawatan khas.

A special treatment will be given to women who have diastolic blood pressure more than 144.1 mmHg. Find the probability of the women manage to get the special treatment.

- (iii) Seterusnya, jika terdapat 3500 wanita di daerah ini, cari jumlah kos rawatan sekiranya rawatan tersebut bernilai RM150 seorang.

Hence, if there are 3500 women in the district, find the total cost of the treatment if the treatment is worth RM150 per person.

[6 markah]

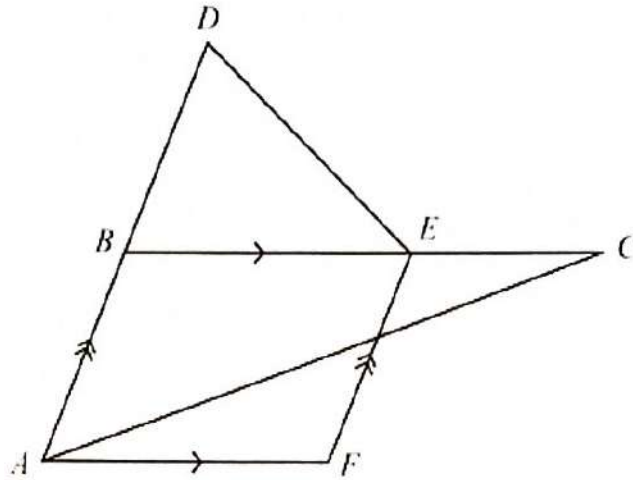
[6 marks]

Jawapan/Answer:

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SULIT

- 9 (a) Rajah 5 menunjukkan trapezium $ADEF$ dan segi tiga ABC .
 Diagram 5 shows trapezium $ADEF$ and triangle ABC .



Rajah 5
 Diagram 5

Diberi bahawa $\overline{AD} = 8x$, $\overline{BE} = 3y$, $\overline{BE} = \frac{3}{5}\overline{BC}$ dan nisbah $AD : FE = 2 : 1$.

It is given that $\overline{AD} = 8x$, $\overline{BE} = 3y$, $\overline{BE} = \frac{3}{5}\overline{BC}$ and ratio $AD : FE = 2 : 1$.

- (i) Ungkapkan \overline{AC} dalam sebutan x dan/atau y . [3 markah]
 Express \overline{AC} in terms of x and/or y . [3 marks]

- (ii) Garis FE dipanjangkan kepada titik M dengan keadaan $\overline{FM} = \frac{8}{5}\overline{FE}$ dan $\overline{BM} = k\overline{AC}$.
 Cari nilai k . [4 markah]

Line FE is extended to a point M such that $\overline{FM} = \frac{8}{5}\overline{FE}$ and $\overline{BM} = k\overline{AC}$.

Find the value of k . [4 marks]

- (b) Lapangan terbang Q terletak di utara lapangan terbang P dan di barat lapangan terbang R. Bearing lapangan terbang R dari lapangan terbang P ialah 036.87° . Sebuah kapal terbang bergerak dari lapangan terbang P ke lapangan terbang R dengan vektor kedudukan ialah $900\mathbf{i}+1200\mathbf{j}$. Selepas itu, kapal terbang tersebut meneruskan perjalanan ke lapangan terbang S yang terletak 3000 km di utara lapangan terbang P dalam masa 2 jam. Cari kelajuan, dalam km/j, bagi kapal terbang tersebut selepas bergerak dari lapangan terbang R. [3 markah]

Airport Q is located at the north of airport P and on the west of airport R. The bearing of airport R from airport P is 036.87° . An airplane travelled from airport P to airport R with position vector of $900\mathbf{i}+1200\mathbf{j}$. After that, the airplane continues its journey to airport S which is located 3000 km on the north of airport P in 2 hours.

Find the speed, in km/h, of the airplane after leaving airport R. [3 marks]

Jawapan / Answer

- 10 Jadual 1 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y , yang diperoleh daripada suatu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $y = \frac{d}{2x - f}$, dengan keadaan d dan f ialah pemalar.

Table 1 shows the values of two variables, x and y , obtained from an experiment. Variables x and y are related by the equation $y = \frac{d}{2x - f}$, where d and f are constants.

x	4.4	6.4	8.6	12	14.9	16.4
y	0.9	0.5	0.34	0.23	0.18	0.16

Jadual 1

Table 1

- (a) Berdasarkan Jadual 1, plotkan $\frac{1}{y}$ melawan x dengan menggunakan skala 2 cm kepada 2 unit pada paksi- x dan 2 cm kepada 1 unit pada paksi- $\frac{1}{y}$.
Seterusnya, lukis garis lurus penyuaian terbaik. [4 markah]

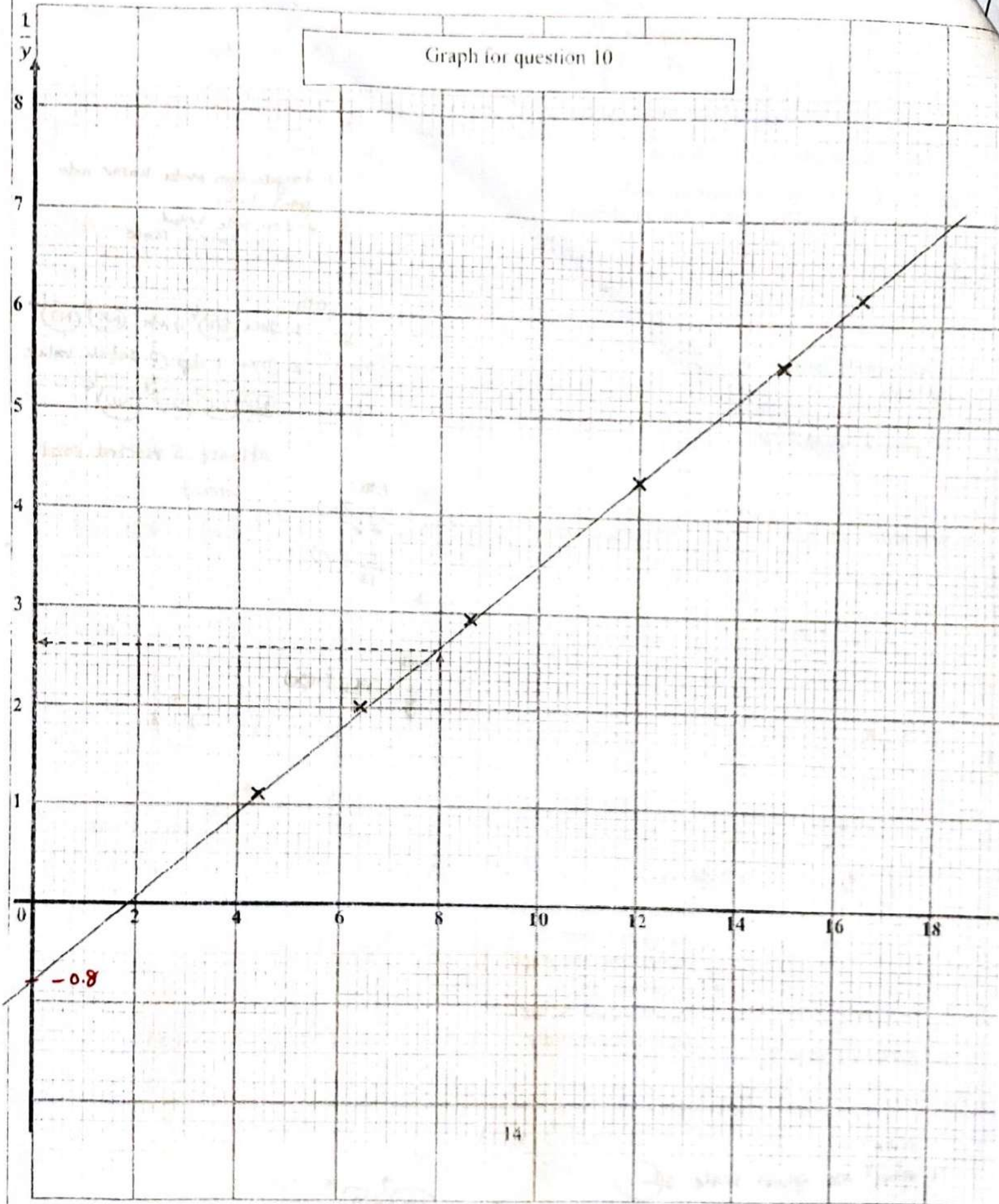
Based on Table 1, plot $\frac{1}{y}$ against x using a scale of 2 cm to 2 units on the x -axis and 2 cm to 1 unit on the $\frac{1}{y}$ -axis.
Hence, draw the line of best fit. [4 marks]

- (b) Dengan menggunakan graf di 10(a), cari nilai
By using the graph in 10(a), find the value of

- (i) y apabila $x = 8$,
 y when $x = 8$,
- (ii) d dan f .
 d and f .

[6 markah]
[6 marks]

Graph for question 10



- 11 Amrin menyertai suatu bengkel membina model geometri. Dia diberi seutas dawai untuk membuat sebuah kerangka kotak berbentuk kuboid. Isipadu kotak itu ialah 375 cm^3 dan panjang tapak kotak adalah dua kali ganda lebar tapaknya.

Amrin participates in a workshop to build a geometric model. He has been given a piece of wire to make a cuboid-shaped box frame. The volume of the box is 375 cm^3 and the base length of the box must be twice its base width.

- (a) Dengan mengambil lebar tapak kotak sebagai x , tunjukkan bahawa panjang dawai yang digunakan adalah $P = 12x + \frac{750}{x^2}$. [3 markah]

By taking the base width of the box as x , show that the length of wire used is

$$P = 12x + \frac{750}{x^2} . \quad [3 \text{ marks}]$$

- (b) (i) Cari nilai x , dalam cm, yang menjadikan nilai P adalah terpendek.
Find the value of x , in cm, that makes the value of P is the shortest.

- (ii) Seterusnya, kira nilai P tersebut.
Hence, calculate the value of P .

[5 markah]

[5 marks]

- (c) Diberi bahawa harga untuk semeter wayar ialah RM 1.80, berapakah yang harus dibelanjakan oleh penganjur bengkel, dalam RM, untuk 30 orang peserta?

[2 markah]

Given that the price for a meter of a wire is RM 1.80, how much should the organizer of the workshop need to spend, in RM, for 30 participants?

[2 marks]

Bahagian C

[20 markah]

Bahagian ini mengandungi empat soalan. Jawab dua soalan.

- 12 Suatu zarah bergerak dalam satu garis lurus dan melalui satu titik tetap O . Halajunya $v \text{ m s}^{-1}$, diberi oleh $v = ht^2 + kt$, dengan keadaan h dan k adalah pemalar dan t ialah masa, dalam saat, selepas melalui O . Zarah tersebut berhenti seketika apabila $t = 3 \text{ s}$ dan pecutannya ialah -3 ms^{-2} apabila $t = 1 \text{ s}$.

[Anggapkan gerakan ke arah kanan sebagai positif]

A particle moves along a straight line and passes through a fixed point O . Its velocity, $v \text{ m s}^{-1}$, is given by $v = ht^2 + kt$, where h and k are constants and t is the time, in second, after passing through O . The particle stops instantaneously when $t = 3 \text{ s}$ and its acceleration is -3 ms^{-2} when $t = 1 \text{ s}$.

[Assume motion to the right is positive]

- (a) Cari nilai bagi h dan nilai k . [4 markah]
Find the value of h and of k . [4 marks]
- (b) Cari julat masa, dalam saat, apabila zarah bergerak ke kiri. [3 markah]
Find the time interval, in second, when the particle moves to the left. [3 marks]
- (c) Hitung jumlah jarak, dalam m, yang dilalui oleh zarah dari $t = 2$ hingga $t = 5$. [3 markah]
Calculate the total distance, in m, travelled by the particle from $t = 2$ to $t = 5$. [3 marks]

Jawapan / Answer:

- 13 Sebuah nurseri mengeluarkan dua jenis baja organik, jenis A dan jenis B. Diberi bahawa nurseri tersebut mengeluarkan x botol baja organik jenis A dan y botol baja organik jenis B dalam sehari.

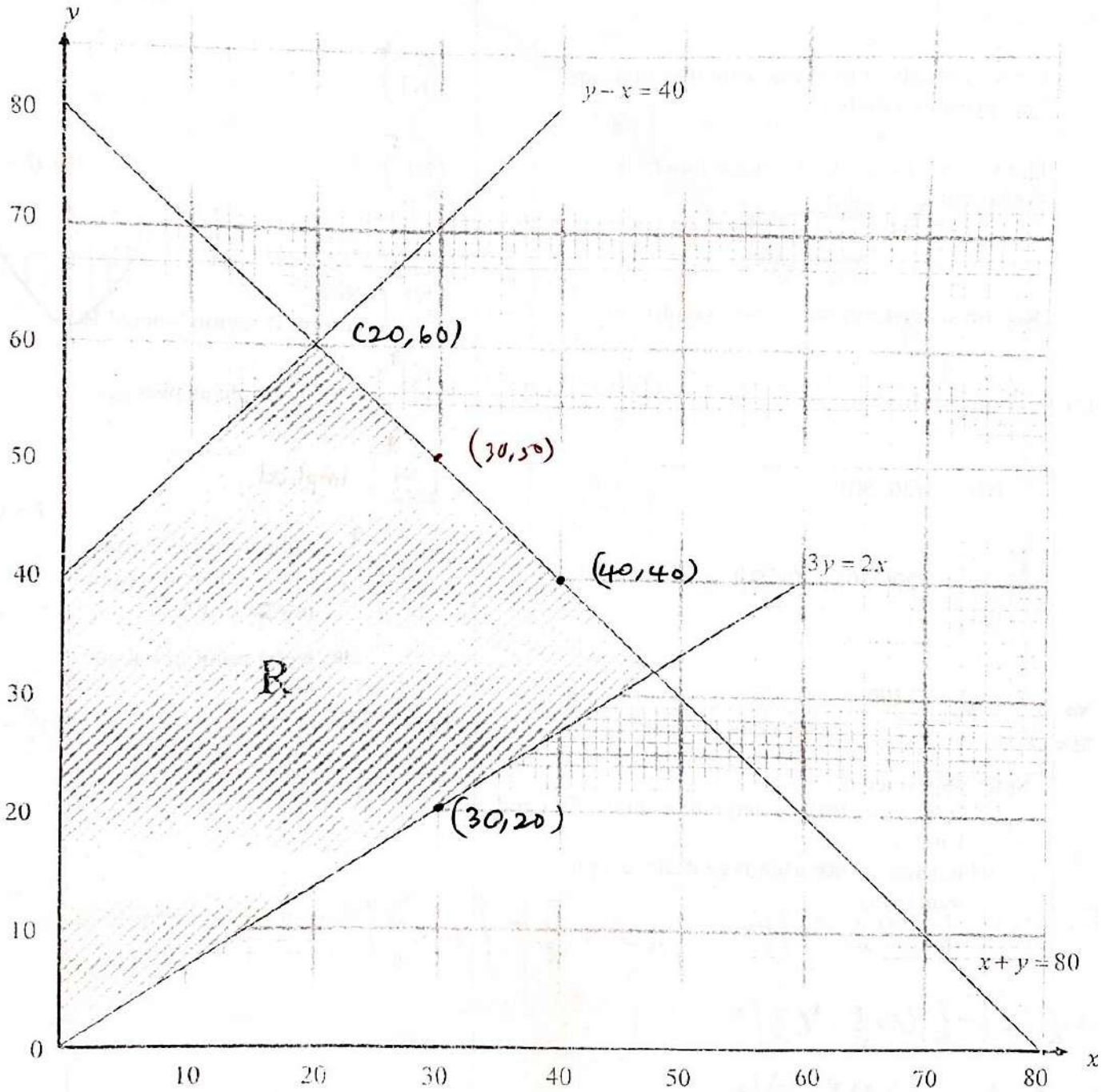
A nursery produces two types of organic fertilizer, type A and type B. It is given that, the nursery produces x bottle of organic fertilizer type A and y bottle of organic fertilizer type B daily.

- I Nisbah bilangan baja organik jenis A kepada bilangan baja organik jenis B adalah selebih-lebihnya 3:2.
The ratio of the number of organic fertilizer type A to the number of organic fertilizer type B is at most 3:2.
- II Jumlah bilangan baja organik jenis A dan jenis B yang dikeluarkan oleh nurseri tersebut tidak melebihi 80 botol.
The total number of organic fertilizer type A and type B that can be produced does not exceed 80 bottles.
- III Bilangan baja organik jenis B melebihi bilangan baja organik jenis A selebih-lebihnya 40.
The number of organic fertilizer type B exceed the number of organic fertilizer type A by at most 40.
- (a) Tulis tiga ketaksamaan, selain daripada $x \geq 0$ dan $y \geq 0$ yang memenuhi semua kekangan di atas. [3 markah]
Write three inequalities, other than $x \geq 0$ and $y \geq 0$ which satisfy all the above constraints. [3 marks]
- (b) Menggunakan skala 2 cm kepada 10 botol pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas. [3 markah]
Using a scale of 2 cm to 10 bottles on both axes, construct and shade the region R which satisfies all the above constraints. [3 marks]
- (c) Gunakan graf yang dibina di 13 (b), untuk menjawab soalan-soalan berikut.
Use the graph constructed in 13 (b), to answer the following questions.
- (i) Pada suatu hari tertentu, hanya 50 botol baja organik jenis B boleh dikeluarkan. Tentukan bilangan minimum baja organik jenis A yang dikeluarkan pada hari itu.
On a particular day, only 50 bottles of organic fertilizer type B are produced. Determine the minimum number of organic fertilizer type A produced on that day.
- (ii) Seterusnya, cari kos maksimum, dalam RM, bagi pengeluaran baja organik pada hari tersebut jika kos pengeluaran sebotol baja jenis A dan jenis B masing-masing ialah RM20.00 dan RM30.00.
Hence, find the maximum cost, in RM, of producing the organic fertilizer on that day if the cost of producing a bottle of fertilizer type A and type B are RM20.00 and RM30.00 respectively.

[4 markah]

[4 marks]

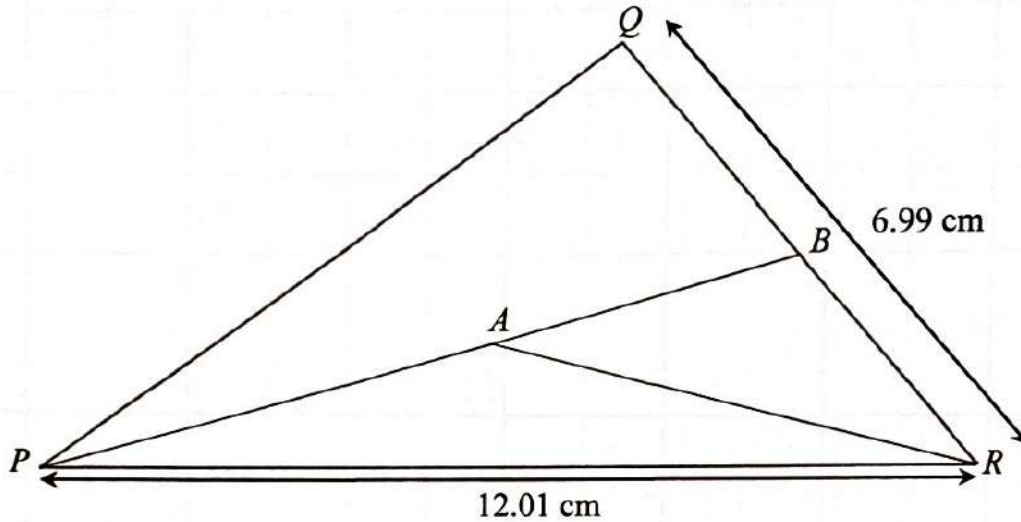
Graph for question 13



- 14 Penyelesaian secara lukisan berskala **tidak** diterima.
*Solution by scale drawing is **not** accepted.*

Rajah 6 menunjukkan segitiga PQR dengan keadaan $\angle PQR$ adalah sudut cakah. Garis lurus PAB bersilang dengan garis lurus AR pada titik A dan B merupakan titik tengah bagi QR .

Diagram 6 shows a triangle PQR such that $\angle PQR$ is an obtuse angle. The straight line PAB intersects the straight line AR at point A and B is the midpoint of QR .



Rajah 6 / Diagram 6

Diberi $2PA = 3AB$ dan jarak terdekat dari titik Q ke garis lurus PR ialah 5.36 cm.

Given that $2PA = 3AB$ and the shortest distance from Q to the straight line PR is 5.36 cm.

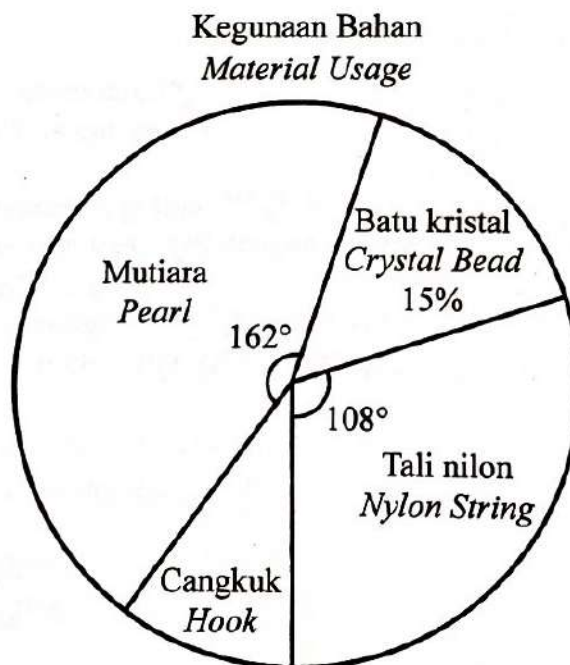
- (a) Cari panjang, dalam cm, PQ . [3 markah]
 Find the length, in cm, of PQ . [3 marks]
- (b) (i) Lakar sebuah segi tiga $P'Q'R'$ yang mempunyai bentuk yang berbeza daripada segi tiga PQR dengan keadaan $P'Q' = PQ$, $Q'R' = QR$ dan $\angle Q'P'R' = \angle QPR$. [1 markah]
 Sketch a triangle $P'Q'R'$ which has a different shape from triangle PQR such that $P'Q' = PQ$, $Q'R' = QR$ and $\angle Q'P'R' = \angle QPR$. [1 mark]
- (ii) Seterusnya, nyatakan saiz $\angle P'R'Q'$. [1 markah]
 Hence, state the size $\angle P'R'Q'$. [1 mark]
- (iii) Cari $\angle QPR$. [2 markah]
 Find $\angle QPR$. [2 marks]
- (c) Cari luas, dalam cm^2 , bagi segi tiga ABR . [3 markah]
 Find the area, in cm^2 , of triangle ABR . [3 marks]

- 15 Jadual 2 menunjukkan indeks harga bagi empat bahan dalam pembuatan sejenis barang kemas.
Rajah 7 menunjukkan agihan penggunaan bahan bagi pembuatan barang kemas tersebut.

Table 2 shows the price indices of four materials in making a type of jewellery.
Diagram 7 shows the distribution of material usage to make the jewellery.

Bahan Material	Harga (RM) per unit pada tahun Price (RM) per unit in the year		Indeks harga tahun 2020 berasaskan tahun 2019 Price index in the year 2020 based on the year 2019
	2019	2020	
Mutiara Pearl	2.50	2.70	p
Batu kristal Crystal Bead	2.00	2.40	120
Tali nilon Nylon String	1.80	q	145
Cangkuk Hook	1.00	1.30	130

Jadual 2
Table 2



Rajah 7
Diagram 7

- (a) Cari nilai p dan nilai q . [3 markah]
Find the value of p and of q . [3 marks]

- (b) Harga cangkuk dijangka akan meningkat sebanyak 12.5% dari tahun 2020 ke tahun 2021.
Hitung indeks harga untuk cangkuk bagi tahun 2021 berasaskan tahun 2019. [2 markah]

The price of the hook is expected to increase by 12.5% from the year 2020 to the year 2021.

Calculate the price index of the hook in 2021 based on the year 2019.

[2 marks]

- (c) (i) Hitung indeks gubahan untuk kos pembuatan barang kemas tersebut pada tahun 2020 berasaskan tahun 2019.

Calculate the composite index for the cost of making the jewellery in the year 2020 based on the year 2019.

- (ii) Kos bagi semua bahan meningkat sebanyak 10% dari tahun 2020 ke tahun 2021.
Jika kos untuk membuat barang kemas pada tahun 2020 adalah RM2.50 lebih murah dari tahun 2021, cari kos membuat barang kemas pada tahun 2021.

The cost of all materials increases 10% from the year 2020 to the year 2021.

If the cost of making a jewellery in 2020 is RM2.50 cheaper than 2021, find the cost of making a jewellery in 2021.

[5 markah]

[5 marks]

[Lihat halaman sebelah